Claims

1. Multilayer data-registering optical disc, comprising:

a transparent substrate;

a plurality of information layers on the transparent substrate, said information layers being spatially divided from one another by polymer layers and assembled with adhesive layers; and

a protective layer covering the plurality of information layers;

each of said plurality of information layers exhibiting a nonlinear response to a recording light beam.

2. Optical disc according to claim 1, wherein the disc substrate, intermediate and adhesive layers are transparent to reading radiation.

3. Optical disc according to claim 1, wherein intermediate layers are 10-300 μm thick.

4. Optical disc according to claim 1, wherein all layers have similar refractive index.

5. Optical disc according to claim 1, wherein the information layers contain spiral grooves.

6. Optical disc according to claim 5, wherein the information layers define planes with a photosensitive substance applied continuously over said planes.

7. Optical disc according to claim 6, wherein a surface of each of the information layers is flooded with a solid layer of photosensitive substance, so that a portion of the solid layer above the grooves is thicker than a portion of the solid layer which is not above the grooves.

8. Optical disc according to claim 6, wherein information surface represents spatially divided photosensitive grooves on non-photosensitive background.

9. Optical disc according to claim 1, wherein the information layers are fluorescent WORM layers.

10. Optical disc according to claim 9, wherein the information layers comprise a substance whose molecular structure is capable of changing due to thermochemical reactions.

11. Optical disc according to claim 9, wherein the fluorescent WORM layers have an at least fifth-order non-linear response to the recording light beam.

12. Optical disc according to claim 9, wherein the fluorescent WORM layers have threshold response to the recording light beam.

13. Optical disc according to claim 9, wherein the fluorescent WORM layers respond to the recording light beam by extinguishing fluorescence.

14. Optical disc according to claim 9, wherein the fluorescent WORM layers respond to the recording light beam by increasing fluorescence.

15. Photosensitive composition for WORM layer, comprising:

- one or more substances and their products after thermochemical reaction, capable to change their fluorescence under recording radiation
- one or more substances, incapable to fluoresce under recording radiation and serving as absorber of recording radiation
- heat-sensitive power-consuming substance, capable to thermochemically react with fluorescent substance or its predecessors
- polymer matrix, containing all ingredients of the composition on molecular level
- an inhibitor of thermochemical response in darkness
- organic solvents, providing solution of all dry composition ingredients

16. Composition according to claim 15, wherein the fluorescent substance or non-fluorescent substances (absorbers) have photodegradation quantum yield at low light intensity below 10^{-7}.

17. Composition according to claim 15, wherein sthyril 9M. (2-(6-(4-dimethylaminophenyl)-2,4-neopentylene-1,3,5-hexatrienyl)-3-methyl-benzotriazolium Perchlorate) is used as fluorescent substance

18. Composition according to claim 15, wherein Rhodamin 800 is used as fluorescent substance

19. Composition according to claim 15, wherein substances, providing composition stability at –40 - +50^{0}C serve as inhibitors.

20. Composition according to claim 15, wherein substances, providing appearance of free radicals at laser radiation absorption and layer heating up to 150-200^{0}C serve for power consumption.

21. Composition according to claim 15, wherein tetrazolophenylthiazolum serves for power consumption.

22. Composition according to claim 15, wherein polymers or their mixtures of polyvinilbutiral type serve as polymeric connector.

23. Composition according to claim 15, wherein malachite green serves as photo absorbent.

24. Composition according to claim 15, consisting of co-polymers, containing covalently connected functional groups in main or side chains, providing fluorescent, light-absorbing and other functions.

25. Photosensitive composition according to claim 15, wherein pH-dependent dyes serve as fluorescence absorbers.

26.A device for writing data to and reading data from a fluorescent medium, the device comprising:

a light source for generating a first light beam for writing the data and a second light beam for reading the data, the first and second light beams having a common wavelength which excites fluorescence in the medium to produce fluorescent light having a fluorescent wavelength different from the common wavelength;

a lens, disposed in a path of the first light beam between the light source and the medium, for focusing the first and second light beams onto the medium and for receiving the fluorescent light from the medium; and

a detector, disposed in a path of the second light beam, for detecting the second light beam and reproducing the data from the second light beam.

27. A device as in claim 26, further comprising a wavelength-dependent beam splitter, disposed in the path of the second light beam between the medium and the detector, for separating the paths of the first and second light beams in accordance with their wavelengths.

28. A device as in claim 27, wherein the beam splitter is disposed in the path of the second light between the lens and the detector.

29. A device as in claim 26, wherein the detector reproduces the data by detecting a difference in an optical parameter between a spot having the data recorded thereon and areas around the spot.

30. A device as in claim 29, wherein the optical parameter is fluorescence.

31. A method of recording information, the method comprising:

(a) providing a multilayer medium comprising a plurality of information layers, each of the plurality of information layers comprising a photosensitive material having a nonlinear response to a recording light beam;

(b) focusing said recording light beam onto a spot on one of the information layers such that an intensity of the recording light beam on said one of the information layers is sufficient to record the information in said one of the information layers, while an intensity of the recording light beam on adjacent ones of the information layers is not sufficient to record the information; and

(c) recording the information on said one of the information layers using said recording light beam.

32. The method of claim 31, wherein the nonlinear response is an at least fifth order nonlinear response.

33. The method of claim 31, wherein the nonlinear response is a threshold nonlinear response.

34. The method of claim 31, wherein step (c) comprises extinguishing a fluorescence in the spot.

35. The method of claim 31, wherein step (c) comprises increasing a fluorescence in the spot.

36. The method of claim 31, wherein step (c) is performed through a thermochemical reaction.